

## Math 116b - Homework 9

**Instructor:** Andrés Eduardo Caicedo

**Due:** March 18, 2008 at 1:00 pm.

This Homework is due in the grader's mailbox by Tuesday March 18 at 1:00 pm. It is an extra credit homework, and **no collaboration** is allowed. Refer to the grading policy for additional requirements.

Our goal is to fill in the gaps of the proof sketched in lecture of the Davis-Matiyasevich-Putnam-Robinson theorem. Recall that the sequence  $\alpha_b(n)$  is defined by

- $\alpha_b(0) = 0$ ,
- $\alpha_b(1) = 1$ ,
- $\alpha_b(n+2) = b\alpha_b(n+1) - \alpha_b(n)$  for  $n \geq 0$ .

1. Show that if  $\alpha_b(k)^2 | \alpha_b(m)$  then  $\alpha_b(k) | m$ .
2. Show that  $\alpha_b(k)^2 | \alpha_b(\alpha_b(k)k)$ .